Field

IoT Data Collection, Dashboard and Analytics Platform

The Intelligent Integration, Monitoring and Control System for IoT and IIoT

FIELD is an advanced monitoring and control IoT system delivered and supported by Texuna.

IoT ("Internet of Things", or IIoT meaning Industrial IoT) is the most emerging technique in Remote Monitoring Systems to transform asset managers understanding of their deployed sensor network and assets. As all information technology and communication technology devices become an integral part of the internet through remote telecommunications and satellite communications - IoT is having a transformative impact on smart cities, smart meters, sensory networks and data collection devices. FIELD provides asset managers with new tools and technologies to improve efficiency, reduce costs, and optimise their operations. By leveraging the power of connected devices and sensors, asset managers can gain valuable insights to maximise their impact of their deployed assets and sensor network, allowing them to make more informed decisions and maximise their resources.

FIELD is an IoT Data Collection and Visualisation Solution to standardise data management from satellite or cellular connected sensors, devices and hubs for presentation in a user-friendly interface. Suitable for smart sensors in urban cities, rivers, remote waterways, FIELD harnesses low cost long term IoT connectivity for better decision-making and enhanced operational efficiency.

Key Features:

- Field offers seamless integration with a wide array of IoT sensors, devices, and hubs, providing a standardised approach to connect and gather data from diverse sources. This ensures compatibility and interoperability across various IoT ecosystems, simplifying the deployment and management of monitoring systems.
- With Field, users can instantly visualise live IoT data in real-time, providing valuable insights into current conditions and trends. The platform's intuitive interface enables users to monitor key metrics and parameters as they evolve, facilitating timely decision-making and proactive intervention.
- Field leverages LoRaWAN technology to enable secure, low-cost, and low-power connectivity for IoT devices, directly transmitting data to satellites. This innovative approach ensures reliable communication even in remote or

challenging environments, extending the reach of monitoring capabilities without compromising efficiency or cost-effectiveness.

- In scenarios where more robust connectivity is required, Field seamlessly integrates with terrestrial cellular networks, enabling high-speed data capture and transmission. This option provides increased bandwidth and reliability, ideal for applications with higher data volumes or stringent latency requirements.
- Field offers automated alerting and exception reporting capabilities, enabling users to receive timely notifications for critical events or anomalies detected in the data stream. This proactive approach allows for swift response and resolution, minimising downtime and mitigating potential risks.
- Field facilitates the mapping of streaming data to a time-series database, providing a structured repository for storing and analysing historical IoT data. This enables users to perform comprehensive reporting and analytics, uncovering insights, trends, and patterns over time to inform strategic decision-making.
- With Field's secure Python-based Jupyter notebook integration, users have the flexibility to perform advanced analytics and modelling directly within the platform. This browser-based environment empowers users to explore data, run custom algorithms, and visualise results, fostering a data-driven approach to decision-making.
- Field adopts a schemaless data structure, offering maximum flexibility in defining and organising metrics, data points, and attributes. This allows users to adapt the platform to suit their specific monitoring requirements, accommodating evolving needs and expanding datasets with ease.
- Field adheres to industry quality and safety standards, ensuring reliability, security, and compliance with regulatory requirements. By upholding stringent standards and best practices, Field provides users with confidence in the integrity and reliability of their monitoring systems.
- Field enables remote, real-time access to IoT data streams, empowering users to monitor assets and operations from anywhere at any time. Additionally, users have the flexibility to configure the frequency of data streaming, optimising bandwidth usage and resource allocation based on specific requirements and priorities.

Key Benefits:

- Individual Analysis enables users to closely examine the performance of each device within their IoT network, facilitating data-driven decision-making. By scrutinising individual device metrics, users can identify trends, anomalies, and potential issues, allowing for targeted interventions and optimization of operations. This granular level of analysis empowers users to maximise efficiency and drive better outcomes across their IoT deployments.
- Visualising IoT device activity offers users a clear and precise overview of their IoT device performance. Through intuitive visualisations, users can easily interpret device activity, identify patterns, and monitor performance metrics in real-time. This visualisation feature enhances decision-making by providing actionable insights into the operation and efficiency of IoT devices within the network.
- Utilising real-time IoT data enables the creation of predictive models and the generation of anomaly warnings. This capability leverages current data streams to anticipate future trends and identify potential irregularities, enhancing decision-making processes and operational efficiency.
- Informed Decisions empower decision-makers with actionable insights derived from IoT data analysis. By harnessing the wealth of information provided by IoT devices, decision-makers can make informed choices that drive business success and innovation.
- Ground-truth alternative data sources, such as Earth Observation data, complement IoT-generated data, providing additional context and accuracy. By integrating diverse data sets, organisations can gain a comprehensive understanding of their operations and environment.
- Correlating data and building predictive models through Python analytics notebook facilitates advanced data analysis and forecasting. This capability allows organisations to identify correlations between different data points and develop predictive models to anticipate future events or outcomes.
- Resource Allocation is optimised through the minimisation of data transmission costs via focused alerts. By strategically directing data transmission to critical areas or events, organisations can reduce operational costs while maintaining data integrity and timeliness.
- Competitive Edge is gained by delegating automated decisions to edge computing hubs. This empowers organisations to respond rapidly to changing conditions and demands, gaining a competitive advantage in the market.

- Cost Reduction is achieved by deploying a field of sensors linked via distributed LoRa hubs. This cost-effective infrastructure minimises the need for extensive cabling and infrastructure, reducing installation and maintenance expenses.
- Remotely monitoring critical infrastructure elements enables proactive maintenance and optimisation. By continuously monitoring key assets and systems, organisations can identify potential issues before they escalate, ensuring uninterrupted operations and maximising efficiency.

Integration

FIELD uses smart IoT-enabled control devices that are used to monitor and control the output of solar power plants, allowing energy producers to adjust their energy production, in real-time, based on energy demand and grid condition.

Monitoring Performance

FIELD uses smart IoT technology to monitor the performance of deployed assets providing real time data on production, consumption, condition or changes against benchmarks. Providing a wide range of measurements and automations to ensure smooth operation and possible loss due to malfunction. These data can be analysed to identify inefficiencies, periods where connectivity with the main network is down, reduced performance and identify areas of improvement.

Predictive Maintenance

FIELD is enabling IOT asset managers to perform predictive maintenance on their equipment. By using FIELD IoT-enabled devices and sensors, managers can monitor the condition of their field of sensor equipment and allow them to schedule maintenance and repairs before problems occur, reducing downtime and increasing efficiency.

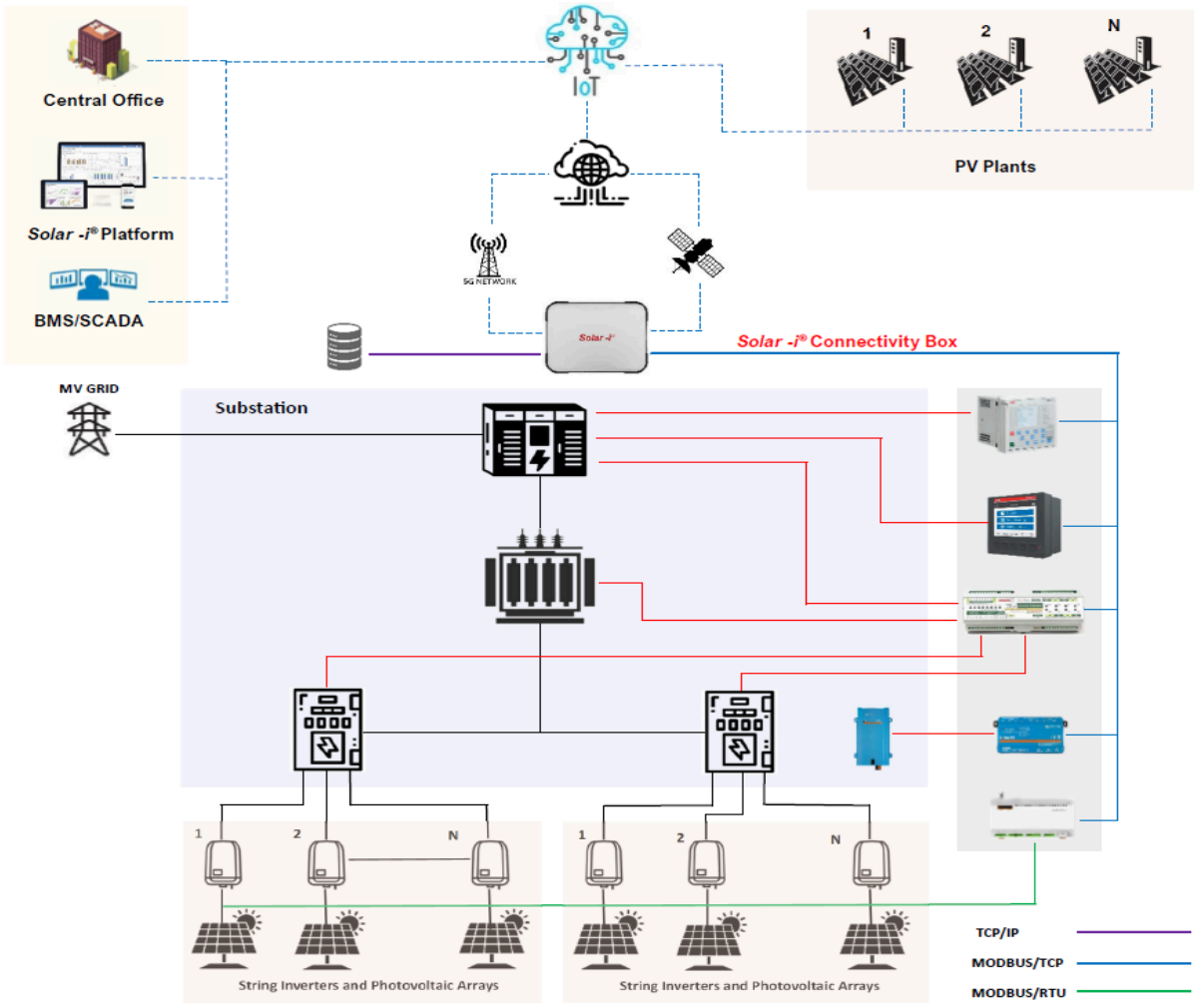
Real-Time Information

FIELD enables nb-IOT, 2.5G-5G and LoRaWAN direct-to-Satellite connectivity to provide high performance resilient IoT communications. This way FIELD provides PV suppliers with real-time information about their energy production and assets condition.

Solution Architecture

FIELD is a complete, state of the art, turnkey solution for every smart city, smart meter, sensor suite or data connectivity hub. The FIELD connectivity box guarantees real-time communication

with plants, installations, facilities and remote deployment locations. Via IoT technology all the critical devices such as sensors, hubs, switches, feeder relays, network analyzers, Off Grid inverters, gateways, and I/O modules, collect and send data while authorised users can modify or control the status. The following example gives an overview of the connectivity for a Solar farm via plug and play substation integration.



FIELD IoT / IIoT has numerous features a wide range of measurements and unlimited storage and remote automations that ensure the smooth operation and minimise the possible loss due

to malfunction. Using AI deep analysis methodologies FIELD can identify inefficiencies, loss of connectivity with the main Grid, utilisation or performance per asset and identify areas of improvement.

FIELD platform supports a number of pre-integrated devices, sensors and asset deployments including:

- Energy Metering
- Water Metering
- Water condition and pollutants (level, flow meter, sensors for turbidity, temp, PH, TSS, TDS, NO, etc)
- Air quality index and pollutants (humidity, temperature, NOx, SO2, O3, particulate matter etc)
- Photo Voltaic PV monitoring
- EVC (electric vehicle charging) monitoring
- Light Management
- Waste Monitoring and collection routing
- Parking Occupancy monitoring and driver / policing apps

Data Security

- Virtual Private Cloud (VPC): Our software operates within a dedicated VPC, ensuring isolation and security for our clients' data and operations.
- Operational efficiency soared with real-time data collection and storage, enabling prompt issue identification and optimization of plant performance while adhering to stringent ITIL, ISO, and Cyber Essentials standards for robust system quality and security.
- Data collection will therefore be securely done over the internet in real-time and stored in the AWS data center

Dashboards and Reporting

The monitoring systems Main Dashboard consists of sections that summarise individual assets and very useful status information.
All data is close to real-time, meaning that as soon as the data is collected and processed, it is immediately readable online, and available for reporting. The frequency of streaming data can be adjusted into periodic data fetches to reduce transmission data and costs (e.g. from every minute to every 15 minutes or hourly etc). The system permits intra-day data values to be reported and analysed separately from daily data records. With periodic frequency intervals,

the last data point is always available for view and report online before the next data point is collected.
Particularly the KPIs can give us an insight of the system deployments, usage, data feeds and/or revenues. Status KPIs are specific to each set of smart sensors or smart meter devices across a portfolio of assets, highlighting any assets where communication has been interrupted. These together with Active Alarm KPIs we can focus remedial actions on sensor and communication devices in order to Recover the system.

Reporting

Default reports will be available for use at any online, and can be filtered as required to display different information and allow all data to be exported. Texuna will also support requests for new reports and analysis ideas. Each user will have their own account and permissions. Texuna do not put a limit on the number of users that can have their own credentials and that can access the system concurrently. The system also differentiates between dashboard and report users and admin users who can see or modify the configuration of the system for new smart readers and to change existing smart readers e.g. for location details, feed-in tariff data and even for engineering drawings for the equipment at each location or even location diagrams if required.

At last, a table presents summary data of the individual assets of the group for a fast overview insight. From this table the user can access any Individual Asset Profile Dashboard. In this Individual asset Dashboard, as in Main Dashboard, monitoring data are available including summary graphs for a most thorough Analysis. An Alarms Page gives OEM personnel the required information concerning Faults and Alarms on all devices.

Data Management

Time-series database is used to store data efficiently for long term analytics and reporting. A separate AWS account is used for each customer project to give maximum assurance of zero contamination with other customer projects.

Access Control: Access to the infrastructure is via secure VPN connection, and no direct internet access is given to the infrastructure components without going through the public gateway endpoint on AWS which is routed through to the webapp interface for authentication and role based access control.

User Access and Authentication

Access to the infrastructure is via secure VPN connection, and no direct internet access is given to the infrastructure components without going through the public gateway endpoint on AWS which is routed through to the webapp interface for authentication and role based access control.

General terms

Information Assurance and ISO 27001

Texuna have a strong focus on high quality delivery and implement rigorous Quality Assurance processes and procedures:

- ISO 9001 certified with BSI as external auditors.
- Cyber Essentials and IASME Governance Standard compliant.
- ISO 27001 certified with BSI as external auditors.
- We are an Amazon Web Services (AWS) cloud hosting certified partner.

Government Classification Scheme (GCS)

Texuna solutions are in use for 'official' level data systems. We ensure that your personal and sensitive data items are identified, encrypted and shown only to those users who have a need to see them. All sensitive and personal data is protected by stringent access control mechanisms. Data in transit and at rest is also encrypted as are all data backup files.

Comprehensive support of good data governance will often underpin data migration as well as best practice data warehouse management. We have a strong track record in migrating legacy systems to create a unified datastore while improving the quality and integrity of the data held (as well as in reducing duplication). This can also be done during data migration.

- Texuna can deliver a metadata rich data warehouse which incorporates best practice design, so that management and maintenance, is cost effective and efficient;
- Texuna will ensure that client data, and especially any personal and sensitive data is:
    - Protected by encryption in transit and at rest;

- Protected by stringent access control;
- Guarded from improper use through sophisticated access and authentication controls;
- Tracked using a comprehensive audit trail that can be reported on.

Backup and Maintenance

Texuna-managed services include support for backups, maintenance, monitoring, disaster recovery and upgrades. Hosting is always provided in zones physically located in the UK so that your data is fully protected.

Invoicing

Charges are invoiced in monthly in advance. Payment terms are 30 days with a purchase order.

Contract Term

Minimum contract term is one year.

On-boarding

The on-boarding steps are as follows:

- Contact Texuna with a draft order form, or submit online request.
- If required, a dialogue is opened to discuss the options most suited to your requirement.
- When options are agreed, the order form is finalised and formally accepted by both parties.
- Within agreed timelines, technical information related to install PaaS will be provided to Texuna.
- The live environments and credentials will be sent to the Customer.

Off-boarding

On deciding to end a subscription, the off-boarding steps are as follows:

- Provide notice of termination at least 30 days (if not a rolling monthly contract).

- All relevant data is extracted and a secure link sent to customer to download. On confirmation of receipt, data is purged and destroyed from servers.

Time to Provision/Deprovision

Dependent on customer requirements and options selected, time to provision is from 48 hours of order form acceptance. Time to de-provision can be from 24 hours of expiry of contract. However for large deployments and bespoke needs, several weeks may be required.

Service Constraints

Texuna applications may be subject to routine maintenance and this will be agreed in advance with our client so that disruption is minimised. Routine maintenance is never scheduled during the normal working day and does not typically result in noticeable downtime.

Customisation can be achieved via Texuna Staffing Solutions. No features will be deprecated without advance agreement with the customer. New features may become available from time to time.

Service Level Agreements

All user account information is encrypted to prevent unauthorised use. The SLA guarantees a monthly uptime percentage of at least 99.9% for SaaS. Different support level options are available as per the detailed pricing schedule. Severity level definitions and response times as well as financial recompense are only available under an enterprise support package.